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FORMS OF THE REPORTS FROM THE TESTING OF WELDED JOINTS (STRUCTURES)

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Abstract: Principle forms of test reports from testing welded structures/joints are listed in international and national standards. They mostly do not contain all the parameters identified by the process. In professional literature there are shape of forms in which is covered in more detail, the structure of the determined properties of the tested material. In this paper are listed the shapes of 12 forms developed for the needs of Faculty of Mechanical and Civil Engineering in Kraljevo, with a short description of the 10 test methods for which they are intended.

Key words: testing of welded joints, destructive and non-destructive testing, contact and contactless testing, surface and depth anomalies in the material, test report, report forms.

1. PENETRANT TESTING

Penetrant testing is used to identify faults that are open on the surface of the material. It is most commonly used for metal testing, but also for testing non-metallic materials or ceramics[6].

The penetrant application procedure consists of five operations: cleaning the examined surface, penetrant application, removing excess penetrant, application developers, reading and interpretation.

The final part of the examination[7], respectively "reading and interpretation", is the most important operation to form a test report, form 1 [4,7]. Determined indicators do not allow the recognition of the dimensions and shape of the error in the direction of the depth (interior of the tested material).

2. VORTEX CURRENT TESTING (FOOK CURRENTS)

Tests based on the application of electromagnetic waves belong to a group of non-destructive and non-contact methods. They are based on the application of electrical and magnetic phenomena, and enable recognition of surface and sub-surface errors in electroconductive materials^[2]; Vortex current testing (Fook currents), magnetic particle testing and magnetic-flux testing (without the use of magnetic particles).

In the windings of the coil through which the alternating current flows, its formed own variable magnetic field, which has the same frequency as well as the current that produced it. By introducing an electro conductive material into the formed variable magnetic field there is an induction of a variable current the opposite direction from the base - wind turbine or Fook current.

In addition to data contained in form 2[4,7] of the report, they should be added:

- probe type and applied frequency,
- covered area; 180[°] or 360[°],
- calibration report.

3. TESTS USING MAGNETIC PARTICLES

Materials that are easily magnetized are examined (ferromagnetic) [6,4]. Errors that come to the surface are recognized (open) or are in its immediate vicinity, but the sensitivity of the method decreases with increasing depth at which they are located.

The method is based on the application of magnetic material in the form of dry splinters, contained in suspensions or in spray bottles. It does not allow high accuracy and reliability of the results, but it's fast, inexpensive and easy to implement. The specificity of the procedure is reflected in the elements which are entered in form 3[4,7] of the report.

4. MAGNETIC FLUX TESTING

Magnetic field testing is a non-destructive procedure which is used to identify errors caused by corrosion or pitting, mainly on pipelines or stable tanks [6]. The tested ferromagnetic material is magnetized, and the density of the induced magnetic flux is recognized by the change in the voltage induced in the winding coils or using Hal's sensors. With increasing intensity of magnetization, the depth of sensitivity of the method increases i.e. the depth at which errors in the material are recognized. The test report shows the results achieved, form 4 [4,7].

5. IONIZING RADIATION TESTS

Tests on ionizing radiation of materials include methods based on the irradiation method, without destroying the tested material, using H, or γ -radiation and a suitable identification material[6].

Quality indicator material (IKS) is equal or less absorption of power from the test material. The radiographs produced are permanently stored, and modern computer capabilities are such that radiograms can be entered in a specially arranged document or to be a supplement to the test report (form 5[4,7]).

6. ULTRASOUND TESTING

Ultrasound has a frequency above the upper limit of sensitivity for normal human ear (20 kHz). In industrial conditions it is used in test procedures (controls) as a contact technique without destruction of the tested material.

When devices are not used during testing for recording the test results, it is appropriate to apply the form 6 [4,7].

7. STATIC TESTS FOR AXIAL FORCES

Here are applied forces whose direction coincides with the axis of test tube; on straining and pressure.

By testing the welded joint on straining are determined tensile strength of welded joints as a whole and tensile strength of metal seam (properties of resistance). Percentage elongation after break (disruption percentage elongation) and percentage constriction of cross section (disruption of cross section) they represent the properties of resistance[6,5].

Since pressure testing is mainly used for testing of brittle materials and rarely plastic ones, it is rarely used for testing welded joints.

Test report, form 7[4,7,3], should include information that fully displays the results achieved and allow repeatability of the test.

8. EXAMINATION OF CONSUMED ENERGY OF IMPACT OR IMPACT TOUGHNESS

The energy used to break the test tube during a single impact is determined. If consumed energy is reduced to the surface of the cross-section, the value of impact toughness is obtained. Otherwise the energy consumed for the fracture is expressed[6].

The device for impact test or Sharp's device provides the necessary initial potential energy which, by releasing the pendulum, turns into kinetic and at the moment of the impact in the tube in the fracture energy.

In the test report, form 8 [4,7], the appearance of the breaking surface should be entered/described.

9. BENDING TEST

The testing determines the technological ability of steel to deform with bending. Also applies to welded constructions/joints by checking whether it can be reached the required/set value of the bending angle and by determining the bending angle until the first crack occurs [6].

The report, form 9[4,7], contains most of the elements that can be expressed on the basis of the bending test.

10. STATIC METHODS OF HARDNESS TESTING

Examination of welded joints is carried out with the aim of determining the hardness of metal seams, HAZ and basic material.

The hardness determined by Brinell's method represents the coefficient of the pressing force F and the surface S, which is generated by the impeller on the surface of the test material. The dimensions of diameters prints are measured, or otherwise determined. The report, form 10 [4,7], includes all the necessary data for the complete presentation of the results of the examinations.

Hardness by Vickers represents the coefficient of the pressing force F and the surface S, which is based on the surface of the test material. The size and shape of the print are different in relation to the imprint of the ball at Brinell's method. Measures are the length of the diagonal square shape of the print. The report, form 11 [4,7,1], contains the necessary data for a complete presentation of the results of the examination.

The hardness of the Rockwell method represents the irreversible depth of the impression made by the imprinting surface of the test material. The specified definition applies for both types of impellers, ball B and cone C, but they differ in applied scale [1]. The report, form 12 [4,7], contains the necessary data for a complete presentation of the results of the examination.

At Vickers and Rockwell methods, the obtained test results obtained on curved surfaces are corrected.

Classical dynamic methods of hardness testing are rarely used. However, when it does, the forms of static methods (form number 10, for example), are used, and portable devices have separate forms of reports that are received in electronic or printed form immediately after the end of the examination.

11. INTERPRETATION OF RESULTS – CONCLUSION

The authors don't consider that these patterns are comprehensive. Such goal isn't unrealistic, but the question is how real and necessary it is to industrial practice. It is expected that the existence of the presented forms is used to create a solution that needs to meet current needs and in that sense can serve as a useful basis.

In aesthetic sense, they also represent a slightly more free approach, and this is a possible contribution to the creation of even more prominent documents. Their appearance can be understood as a kind of critique of existing and of the standards presented of non-formal and formal solutions.

LITERATURE

- [1] ASM Handbook, Volume 8, Mechanical Testing and Evaluation, ISBN 0-87170-389-0, 2003
- [2] Buckley, J.: An introduction to Eddy Current Testing theory and technology, Internet izdanje
- [3] Vukićević, M.: Projektovanje tehnologije zavarivanja. Knjiga 2. Метоdologija, ISBN 978-86-82631-71-2, COBИSS.SR-ID 207487244,

Fakultet za mašinstvo i građevinarstvo u Kraljevu, Kraljevo, 2014

- [4] Vukićević, M.: Tehnologija spajanja materijala.
 Praktikum., ISBN 978-86-82631-97-2, Fakultet za mašinstvo i građevinarstvo u Kraljevu, Kraljevo 2018
- [5] Vukićević, M.: Mašinski materijali. Priručnik., ISBN 978-86-86283-03-0, COB/ISS.SR-ID 140265228, Kraljevski glasnik, Kraljevo, 2007
- [6] Djordjević, V., Vukićević, M: Mašinski materijali. Praktikum za vežbe. I deo, ISBN 86– 7083–047–7, Mašinski fakultet u Beogradu, Beograd 1998

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Form 1. Penetrant testing report.

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Form 2. Test report from testing by the method of vortex current (Fooks).

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Form 3. Test report from testing by the method of magnetic particles.

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Type:	Pipe/plate	Dimensions:		Th	ickness, 🛙	5	
Previous treatment:							
Surface coating							
Thermal treatment:	yes/no	Type:					
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Form 4. Test report from testing by the method of magnetic flux.

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Thermal treatment:		yes /no	Ty	pe:				weldin	g.		
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Warning about the											
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					_	Plan of	testing.				
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defectoscope:	-		Expositi			-					-
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process			Type IK						R; level of r	ecognition	
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Temperature of env Temperature of sam Surface cleaner An integral 1. 2. Image qual Number of visible edge	ions ironment pple part of ity (IK: Smallest isible edge or opening	the re	port a 1027)	re ra	diogr Smallest Tha distancet	rams	ay of drying herwards clean of the f	Smallest visible edg	ng specifie	Level of recognition	Smallest 'i na distan
Temperature of env Temperature of sam Surface cheaner: An integral 1. 2. Image qual Number of visible edge or openings 1. 2. Description	ions ironment uple: I part of ity (IKS Smallest isible edge or opening d, mm	f the re S, ISO Quality index N	port a 1027) Level recogni R, %	of tion	diogr Smallest Fna distance Gas, mm	ams 4.5.	ay of drying herwards clean of the f	Smallest visible edg	ng specifie	Level of recognition	Smallest 'i na distan
Temperature of env Temperature of sam Surface cleaner An integral 1. 2. Image qual Number of visible edge	ions ironment uple: I part of ity (IKS Smallest isible edge or opening d, mm	f the re S, ISO Quality index N	port a 1027) Level recogni R, %	of tion	diogr Smallest Fna distance Gas, mm	rams	ay of drying herwards clean of the f	Smallest visible edg	ng specifie	Level of recognition	Smallest 'i na distanc
Imperature of env Imperature of sam surface cheaner: An integral Image qual Number of visible edge or openings 1. 2. Description	ions ironment uple: I part of ity (IKS Smallest isible edge or opening d, mm	f the re S, ISO Quality index N	port a 1027) Level recogni R, %	of tion	diogr Smallest Fna distance Gas, mm	ams 4.5.	ay of drying herwards clean of the f	Smallest visible edg	ng specifie	Level of recognition	Smallest 'i na distan
Imperature of env Imperature of any Image qual Image qual Number of visite cdaps 1 2 Description 1. 2.	ions ironment: sple: l part of ity (IK: Smallest isible edge or opening d, mm	the re S, ISO Quality index N	1027)) of ion i licati	diogr Smallest Fna distance Gas, mm	Wi Ad 5 4. 5	ay of drying: herwards clean of the f	Smallest visible edg or opening d, mm	ng specifie	Level of recognition	Smallest 'i na distan
Imperiate of env Imperiate of an An integral 2 Image qual Number of visible dege 1 2 Description 1. 2 Verification	ions ironment: sple: l part of ity (IK: Smallest isible edge or opening d, mm	the re S, ISO Quality index N	1027)	re ra	diogr Smallest Fna distance Gas, mm	Wi Ad 5 4. 5	ay of drying: herwards clear of the f Number of visible edge or openings	Smallest Smallest visible edg or opening d, mm	ng specifie	Level of recognition	Smallest 'i na distanc
Imperiate of env Imperiate of an An integral An integral Image qual Number of visite edge v visite edge v 1. Description I. Verification Place of testing: Member of the Member of the Number o	ions ironment pple l part of ity (IK: Smallest isible edge r opening d, mm h and lo	the re S, ISO Quality index N	1027)) of ion i licati	diogr Smallest Fna distance Gas, mm	Wi Ad 5 4. 5	ay of drying: herwards clean of the f	Smallest Smallest visible edg or opening d, mm	ng specifie	Level of recognition	Smallest 'i na distanc f _{asa,} mm
Imperature of env Imperature of ansi transe cleaner An integral Image qual Number of yinhic deg or openings 2 Description 1. 2 Verification Place of testing: Hembson db	ions ironment pple l part of ity (IK: Smallest isible edge r opening d, mm h and lo	the re S, ISO Quality index N	1027) Level R, 36 of inc	re ra	diogr Fna Gos, mm	Wi Ad 5 4. 5	ay of drying: herwards clear of the f Number of visible edge or openings	Smallest visible edg or opening d, mm	ng specifie	Level of recognition	Smallest 'Y na distan fson, mm

Form 5. Test report from testing by radiography method.

company:	Pac and	ulty of Mee 1 Civil Engin	iantea ieering	N		i-de	stri		e test	ing I	IDT			source							
Sektor:		CESiM		<u>n – </u>	1920	- 19 A A A A A A A A A A A A A A A A A A		-055000		9	0.0110	Sec	ondl	it. sou	rde:		_				
			1	ſes	tin	g t	οy ι	ultra	asou	nd	me	tho	d								
Report number:				1								Pag	e nu	nber:				Te	tal p	ages:	Т
Orderer:				Ad	ress			_				Dat			_	_	_		_	-	_
Project:						-						Par									
Author:	_													ogical	shee	et:					_
Sertificate number														numb							
Examined part:	-											Cha	racte	ristic:							
											_			mber:	_	-		D/	cum	ent	T
Dimensions:				Ty	pe of	f join	t:							nber:		-			oup:	Citti .	+
Base material:				-				-				Pric		aber:		-	-		odel		+
Additional materia	1.											1		0000200			-	11.4	Perer	10.	
Previous treatmen					_	_	_					Pro	cess	of wel	ding	p					
Condition of surfac		n: yes/no		Out	ides:		s/no	Cast	ings:	monto		1				-	-				-
Thermal treatment						ye.	5/10	Coa	angs.	yes/1	10	Tec	hono	logical	l she	et					
Narning about the		yes /no		Ty	pe:	_		-				-	- 1462.0	0.2010			-				-
Warning about the est:	6																				
est: /olume of testing:								D.	oftest	lation 1											_
/olume of testing:	_				_	_	_	Plan	of test	ing:	_	_	_		_	_	_	_	_	_	_
Type and nanufacturer of he device:	Type a manuf sound:	acturer of th	se Re	equen al ang librat	gle o	f the	bean	n:				Ske	tch o	f samp	iles:						
	100000000		Co	ntact	med	lium															
			De						ocedu				·							ves	7
Femperature of en Femperature of sa		nt	_	_					Way of Afterw			ng (me	diun	1):							-
Surface cleaner:														-							
Coordinate system																					
Geometric		about		icat	tio	ns	~		x, y, z ℓ _x , ℓ _y , 0 - coo	ℓ _x - di din dinate	mens ection start	ions ol 15	f erro	the en r in co	or ordin	1				1	5
				y I	2	\mathbb{D}_{s}	8,		x	y	z	Bx.	B.						13x	B _x	
x y z	B _x 0)	х	3	~ I)		У		mT.	and a			х	У	z		-	B
1.	B _x D	² x) 4.	x	y				~	7.	y		mit)	10.	x	У	z	_		0
L C	B, D	4. 5.	x	y					7.	y	-	mT)	11	x	У	z			0
	B _x D	² x) 4.	x	y	-				7.	y		mr.)		x	y	z			0
Description) 4. 5. 6.							7.	y		wg .)	11	x	y	z			
L. 2. 3. Description L. 2. 3.	n of i	⁴) 4. 5. 6. ndicati 4. 5. 6.							7. 8. 9. 7. 8.)	11. 12. 10.	x	y	z			
x y z <u>1.</u> <u>2.</u> 3. Description <u>1.</u> <u>2.</u> <u>3.</u> Verification Place of testing:	n of i	⁴) 4. 5. 6. ndicati 4. 5. 6.			Date		sting		7. 8. 9. 7. 8.	Nam	e of	mī.)	11. 12. 10.	x	y	2		lignal	
L. 2. 3. Verification Place of testing: Member of commission Member of commission	n of i n of r	⁴) 4. 5. 6. ndicati 4. 5. 6.			Date				7. 8. 9. 7. 8.		e of)	11. 12. 10.	x	y	2			

Form 6. Test report from testing by ultrasound method.

	Mechanical an Civil Engineering	0	Desruct	ive testi	ng	Literary source:	180 4136
Sektor:	CESiM	-				Second lit. source:	ISO 6892
		1	11	11111			98
		Testi	ng on to	ensile/pr	essure		
Number of report.						Page number:	Total pages
Orderer:		Adress:				Date	
Project:						Deo:	
Author:						Techonological sheet	
Sertificate number:						Drawing number:	
Examined part:	1					Characteristic:	
Data about sa	mple/test t	ube					
Dimensions:	1	Type of join	c	1		Seam number: Part number:	Document: Group:
Base material:						Price:	Model br.
Aditional material:	-						Interest of
Previous treatment:	-	202		34		Process of welding:	
Condition of surface:	Clean: yes/no	Oxides: ye	s/no	Coatings	da/ne	Technological sheet of	
Thermal treatment:	yes /no	Type:				welding:	
Warning about test:						Breaking and	deformation diagram
Fest condition	/115						
emperature of sample surface cleaner:	e:	Aft	oping:	ning (medium	yes/		
Temperature of enviro Temperature of sampls surface cleaner Sketch of test to Tested Tetsed sample number	e ube (descri aults s Maximum	Aft	erwards clea oping:	observed i	yes/		
Temperature of sample surface cleaner: Sketch of test t Tensile test res Tetsed Dimension	e ube (descri	An Sig ption and Tensile strenght of material, Dn N/mm ²	erwards clea pping data on (Positio of rupture(on	Note	yes/		Signatu

Form 7. Test report from testing by straining/pressure.

The name of the company:	Faculty of Mechanical and Civil Engineering in Kraljevo	Desr	uctiv	e testi	ng	Literary	source	SRPS	C.A4. 004
Sector:	CESIM					Second	lit. source:		
(Consumed	energy of ir	npact	and/o	r impac	t tough	ness		
lumber of report		1.00				Page nu:	mber:	1	Total pages:
ordered:		Address:				Date:		_	
roject:						Part:			
uthor:						Technol	ogical sheet:		
ertificate number:							number:		
xamined part:						Characte	ristic:		
Sample data	i i								
imensions:		Type of joint:	1				of seam:		Document:
		Type of John.				Part nun	aber:		Group:
ase material:						Price:		-	Model nu.
dditional material:						Process	of welding:		
revious treatment:	Class: usslas	Phildren market		Castlean	washing	1.		-	
ondition of surface hermal treatment	ves/no	Oxides: yes/no Type:		Coatings:	yes/no	of weldi	ogical sheet	1	
est warning:	yes /ho	Type.				joi weidi	ng	-	
ferms of exami									
ominal pendulum e	nergy, J:		15	10, 300	Envirome	int temperati	are, °C:		
faximum pendulum	speed, m/s:				Sample to	mperature,	C:		
Type and device	e producer	Device Certifi	cate :	-	Certifica	te holder:	D	te of issu	ae of the certificate
Neviation from stand	lard procedures (att	achment report):		-			ves/no		
Sketch of sa Hardness te:		are position		sketen			~		
serial	insumed energy of	Impact toughness,	Note						
nu.	E, J	p, J/mm ²							
1.									
2.									
3.			_					_	
4.			-						
/erification	of the repo	ort	1						
	or the rept								1.0.
lace of testing:		Date of	testing:		Name of	laborant			Signature
lember of the									
esponsible person			_	-			1		
ame)		Certific	ate nu.:		Date of d	erivation:	Vali	until:	
sectory J.					-				

Form 8. Report from the study of consumed energy of impact or impact toughness.

The name of the company:	Faculty of Mechanical an Civil Engineerin in Kraljevo	d ng I	Desructive	testing	Literary	source:	SRPS C.	a)
Sector	GESIM				Second	lit. source:	8 2	
				unere la				
			Bending	test				
Number or report:				C. 2000	Dever		-	Total manager
Ordered:		Address:			Page nu Date:	mber;		Total pages::
Project:	-	Address			Part			
Author:						ogical sheet	n	
Sertificate number:						number	1	
examined part:					Characte			
Tube data								
					Mumber	of seam:		Document:
Dimension:		Type of join	iC		Part num		-	Group:
Base material:					Price:	inter.		Model nu.
Additional material	E					6 10		in the second
Previous treatment		- 22	50		Process	of welding:	8.1	
Condition of surfac			25/no C	oatings: yes/no		ogical sheet	t)	
Thermal treatment	yes /no	Type:		2003021011-920003	of weldi	ng:		
Fest warning:								
Type and devi			Certificate :	com	ficate holder:		Alle of Issue (of the certificate:
Deviation from star	ndard procedures (a	attachment repo	ert):			ves/no		
sketch of s	ample with	i tile posi	ition and di	awing of	test tube			
Test results	5							
Serial nu. Type of to	est Of tube L-a-b, mm	Imppeler diameter d, mm	Distance between the rollers L, mm	Realized bending angle a, °	Flexibility K, %	Note		
1.	and the second s							
2.								
3.								
Verificatio	n of the rep	port						
Place of testine:		lr.	Date of testing	Namo	of laborant			Signature
Member of the	_	[[Date of testing:	Name	of laborant			Signature
Place of testing: Member of the commision (name)][Date of testing:					Signature
Member of the			Date of testing:	Date o	of	Valid	1	Signature

Form 9. Bending test report.

The name of the company: Sector	Mechanical and Civil Engineering in Kraljevo CESiM				Literary source:	SRPS C A4, 003
Sector:	C. Carton				Taccond the source.	
		Brine	ll metho	d		
Number or report:		1			Page number:	Total pages:
Ordered:		Address:			Date:	
Project:					Part	
Author: Sertificate number					Technological sheet: Drawing number:	-
Examined part:					Characteristic:	
Sample da	ta					
					Number of seam:	Document:
Dimension:		Type of joint:			Part number:	Group:
Base material:					Price:	Model nu.
Additional materia					Process of welding:	
Previous treatment Condition of surfa	Class web	Oxides: yes/no	Continue	yes/no		
Condition of surfa Thermal treatment	ce: Clean: yes/no yes/no	Type:	Coatings	yewno	Technological sheet of welding:	
Test warning:	yes no	Trype.			for estund.	
Test condi	tions					
Material of the bal		w/w		Imprinting	time s	
Diameter of the ba		10, 5, 2.5,	1		nt temperature, °C:	-
	ai, mitt:	10, 5, 2.5,	3D -			1
	e impact force, kN:	30, 10, 5, 2	2.5		mperature, °C:	
The intensity of th		30, 10, 5, 3	2.5			
The intensity of th	t data		2.5 Device Certifi	Sample ter		Date of issue of the certificate:
The intensity of th Equipment Type and device	t data producer: Op	tical devices:		Sample ter	mperature, °C: Certificate holder:	Date of issue of the certificate:
The intensity of th Equipment Type and device Deviation from sta	t data producer: Op indard procedures (at	tical devices:	Device Certifi	Sample ter	mperature, °C:	
The intensity of th Equipment Type and device Deviation from sta Sketch of s	t data producer: Op indard procedures (at	tical devices: tachment report): imprint locatio	Device Certifi	Sample ter	mperature, °C: Certificate holder:	
The intensity of th Equipment Type and device Deviation from sta Sketch of s Results of Serial NY	t data producer: Op indard procedures (at sample with	tical devices: tachment report): imprint location sting	Device Certifi	Sample ter	mperature, °C: Certificate holder:	
The intensity of th Equipment Type and device Deviation from sta Sketch of s Results of	t data producer: Op indard procedures (at sample with hardness tes	sting	Device Certifi DDS	Sample ter	mperature, °C: Certificate holder:	
The intensity of th Equipment Type and device Deviation from sta Sketch of s Results of Serial	t data producer: Op indard procedures (at sample with hardness tes	tical devices: tachment report): imprint location sting	Device Certifi DDS	Sample ter	mperature, °C: Certificate holder:	
The intensity of th Equipment Type and device Deviation from sta Sketch of s Results of Serial NY	t data producer: Op indard procedures (at sample with hardness tes	tical devices: tachment report): imprint location sting	Device Certifi DDS	Sample ter	mperature, °C: Certificate holder:	
The intensity of th Equipment Type and device Deviation from sta Sketch of s Results of Serial NV	t data producer: Op indard procedures (at sample with hardness tes Serial nu.	tical devices: tachment report): imprint location sting NV Serial nu	Device Certifi DDS	Sample ter	mperature, °C: Certificate holder:	
The intensity of th Equipment Type and device Deviation from sta Sketch of s Results of Serial NV	t data producer: Op indard procedures (at sample with hardness tes	tical devices: tachment report): imprint location sting NV Serial nu	Device Certifi DDS	Sample ter	mperature; *C: Certificate holder: yew/no	
The intensity of th Equipment Type and device Deviation from sta Sketch of s Results of Serial nu. NV	t data producer: Op indard procedures (at sample with hardness tes Serial nu.	tical devices: tachment report): imprint location sting NV Serial nu	Device Certifi DDevice Certifi DNS	Sample tei	mperature; *C: Certificate holder: yes/ho	certificate
The intensity of th Equipment Type and device Deviation from sta Sketch of s Sketch of s Striat NV Verification Verification Place of testing	t data resolucer Or mand procedures (at sample with hardness tes Serial na. n of the repr	tical devices: tachment report): imprint location sting NV Serial nu nu nu nu nu nu nu nu nu nu	Device Certifi DDevice Certifi DNS	Sample ter	mperature; *C: Certificate holder: yes/ho	
The intensity of the Equipment Type and device Deviation from state Sketch of states of Sketch of states o	t data revolver: Or produce: Or sample with hardness tes serial m n of the repute	tical devices: tachment report): imprint location sting NV Serial nu nu nu nu nu nu nu nu nu nu	Device Certifi DDevice Certifi DDS	Sample tei	mperature; *C: Certificate holder: yes/ho	certificate

Form 10. Report from hardness testing by Brinell method.

company: Sector:	Mechanical and Civil Engineering in Kraljevo CESiM				Literary source: Second lit. source:	
		Vicker	s metho	d		
Number or report:		1			Page number	Total pages:
Ordered		Address			Date:	Tour peges
Project:		Tradition	-		Part	
Author:					Technological sheet:	
Sertificate number:					Drawing number:	
Examined part:					Characteristic:	
Sample dat	a					
Dimension:		Type of joint:			Number of seam:	Document:
		171-2 Or John			Part number:	Group:
Base material	-	100 C			Price:	Model nu.
Additional material Previous treatment:					Process of welding:	
Condition of surface		Oxides: yes/no	Coatings	yes/no	Technological sheet	
Thermal treatment:	yes/no	Type:	s, outings	34310	of welding:	
Test warning		we /convex surfaces are t	ested (engirdle	e) Correct	ion coefficient K=	10 million - 10 mi
The intensity of the Imprinting time, s:	impact force, kN:	30, 20, 10	5		t temperature, °C: nperature, °C:	-
Type and device p	roducer: Op	tical devices:	Device Certifi	cate :	Certificate holder:	
Deviation from stan	idard procedures (att			cate :	Certificate holder: yes/no	Date of issue of the certificate
Deviation from stan	idard procedures (att	achment report):		cate :		
Deviation from stan	ample with	achment report):		Note		
Deviation from star Sketch of si Results of I	and procedures (att ample with	achment report): imprint location ting	ons			
Deviation from stan Sketch of si Sketch of si Serial HV	and procedures (att ample with	achment report) imprint location ting HV Senal N	ons			
Results of f sister from the second s	dard procedures (att ample with nardness tes Serial nu.	achment report) imprint location ting HV Senal N	ns HV		yesho	
Deviation from stars	dard procedures (att ample with nardness tes Serial nu.	achment report) imprint location ting HV Serial mu Drt	ns HV	Note	yesho	cerificate
Deviation from stan Sketch of s Results of I Serial HV	and prevenues (and ample with anardness tes	achment report) imprint location ting HV Serial mu Drt	HV	Note	yesho	cerificate

Form 11. Report from hardness testing by Vickers method.

The name of the company:		culty of anical and Civil neering in raljevo 'ESIM					Literary source Second lit. sou		SRPS C.A		
			Roc		ethod B	or C					
Number or report:			1		0		Page number:			Total page	
Ordered:			Address:				Date				-
Project:							Part	1			_
Author: Sertificate number:	-						Technological Drawing numb	sheet.			
Examined part:							Characteristic:				_
Sample dat	a										
Dimension:			Type of join				Number of sea	m:		Document	
	_		. ype or Join				Part number:			Group:	_
Base material: Additional material							Price:			Model nu.	
Previous treatment:							Process of web	ding			
Condition of surfac	e: Clean	: yes/no		es/no	Coatings	yes/no	Technological	sheet			
Thermal treatment:	y	es /no	Type:			La.	of welding:				_
Test warning:	- 1 - 3	rtat /conca	ive /convex si	urfaces are tes	ted (engirdle)	Correc	tion coefficient K-	2			_
Test condit		Method	Initial Fe	Main F1	Total	Time of th	e full load operati	on, s:			
	07/7/2				1.100						
force, kN:	data	B C Opt	Fe 98.07 08.07 tical devices:	1373 882.6	1471 980.7	Sample ter	tt temperature, °C nperature, °C: Certificate holde			of issue of	the
	data roducer:	C	98.07 98.07 tical devices	1373 882.6 D	980.7	Sample ter	nperature, °C: Certificate holde	a.		of issue of	the
force, kN: Equipment Type and device p Deviation from star	data producer:	C Opt	98.07 98.07 tical devices:	1373 882.6 D	980.7 evice Certifica	Sample ter	nperature, °C: Certificate holde				the
force, kN: Equipment Type and device p Deviation from staa Sketch of s Results of	data eroducer: ndard proc ample	c opp edures (att with	98.07 98.07 tical devices: iaehment report	1373 B82.6 rt): Iocation	980.7 evice Certifica	Sample ter	nperature, °C: Certificate holde	a.			the
force, kN: Equipment Type and device p Deviation from sha Sketch of s	data eroducer: ndard proc ample	C Option odures (att	98.07 98.07 tical devices: iaehment report	1373 882.6 D	980.7 evice Certifica	Sample ter	nperature, °C: Certificate holde	s/no		ertificate:	the
force, LN: Equipment Type and device p Deviation from stat Sketch of s Results of I Serial HR_	data wroducer: indard proc ample hardne Ser	oppe odures (att with ess tes ial nu.	US 07 US 07 US 07 Inical devices: achment report imprint ting HR_	1373 182.6 Dx ett: location	980.7 evvice Certifica	Sample ter	nperature, *C: Certificate holde ye	s/no		ertificate:	the
force, LNI Equipment Type and device p Deviation from state Sketch of s Results of I Strat nu. IIR_ Verification	data wroducer: indard proc ample hardne Ser	oppe odures (att with ess tes ial nu.	98.07 98.07 98.07 Inical devices: achment repo imprint ting HR	1373 182.6 D 10 10 10 10 10 10 10 10 10 10 10 10 10	evice Certifica	Sample ter	nperatore, *C: Certificate holds ye	s/no		abel)	
force, LSE Equipment Type and device p Deviation from ata Sketch of s Results of I String Number of S String Number of S String String Number of S String Strin	data wroducer: indard proc ample hardne Ser	oppe odures (att with ess tes ial nu.	98.07 98.07 98.07 Inical devices: achment repo imprint ting HR	1373 182.6 Dx ett: location	evice Certifica	Sample ter	nperators, *C: Certificate holde yet he dash should be	s/no		ertificate:	
force, LN: Equipment Type and device p Deviation from state Sketch of s Results of I Striat nu. IR_ Verification Place of using	data nodard procession andard procession ample Ser n of th	oppe odures (att with ess tes ial nu.	98.07 98.07 98.07 Inical devices: achment repo imprint ting HR	1373 182.6 D 10 10 10 10 10 10 10 10 10 10 10 10 10	evice Certifica	Sample ter	nperators, *C: Certificate holde yet he dash should be	s/no		abel)	
force, kN: Equipment Type and device p Deviation from shar Sketch of s Results of Serial	data ndard proc hardne ser n of th	oppe odures (att with ess tes ial nu.	98.07 UE 07 Inical devices: achment repo imprint ting HR	1373 182.6 D 10 10 10 10 10 10 10 10 10 10 10 10 10	evice Certifica	Sample ter	the dash should be	s/no		abel)	

Form 12. Report from hardness testing by Rockwell method